ATTACHMENT 9

Procedures and Specifications

Part a) Quality Control Procedures

I. General Requirements

(A) Quality control measures shall be implemented by the contractor and will ensure that emission measurement equipment is calibrated and maintained according to procedures listed in this manual and in the contract between Missouri Department of Natural Resources (MDNR) and the contractor. All inspection records, calibration and maintenance records, and control charts shall be accurately created, recorded, and maintained. Quality control requirements are enforced by MDNR.

(B) Quality control standards and criteria for all test equipment shall be as follows:

1. At a minimum, the practices described in this manual, in the contract, and in July 1998 Title 40 CFR Part 51, Subchapter S, Appendix A shall be followed.
2. Preventive maintenance on all inspection equipment shall be performed on a periodic basis, as provided by the contract between MDNR and the contractor and consistent with Environmental Protection Agency (EPA) and the equipment manufacturer's requirements.
3. To assure quality control, computerized analyzers will automatically record quality control check information, lockouts, attempted tampering and any circumstances which require a service representative to work on the equipment.
4. To assure test accuracy, equipment shall be maintained according to demonstrated good engineering practices.
5. Computer control of quality assurance checks and quality control charts shall be used whenever possible.
6. Emission equipment shall be placed out of service when calibration can not be performed according to procedures established by MDNR.

(C) Calibration and maintenance procedures for:

1. Steady-state emissions testing equipment shall be as described in July 1998 Title 40 CFR Part 51, Subchapter S, Appendix A, paragraph (I).
2. Transient exhaust emissions testing equipment shall be as described in July 1998 Title 40 CFR Part 51, Subchapter S, Appendix A, paragraph (II) or as described in any other procedure approved by EPA and MDNR.

(D) If EPA develops and approves other emission test equipment, including test equipment prescribed in this section, MDNR may adopt the use of subsequently approved emissions test equipment.

II. Quality Control Procedures Manual

The contractor's Procedures Manual shall contain complete procedures used by the contractor to assure quality control throughout the I/M program network. The Procedures Manual is divided into the following sections:

(A) Station Operations Manual.

1. Contractor Employees - describes the organization of the contractor's Missouri I/M program, employee responsibilities, uniform requirements, and consumer information hot-line services.
2. Inspection Station Facility - includes the physical layout of an inspection station and responsibilities for maintenance and repair.
3. Operating Procedures - includes standard daily and weekly operating procedures.
4. Complaint Handling - includes guidelines for handling consumer complaints.
5. Safety - describes safety requirements, employee responsibilities, accident prevention, and reporting procedures.
6. Inspection Station Emergency Procedures - describes recommendations for handling and reporting a variety of emergencies.
7. Telephone Inquiries - includes guidelines for handling all telephone calls.
8. Human Resources - discusses employment recruitment, hiring, and training.
9. Ordering and Receiving - includes guidelines on ordering supplies and maintenance spare parts, as well as receiving vendor shipments.
10. Daily Station Checklist - checklist used for daily station operations and maintenance.
11. Weekly Station Checklist - checklist used for weekly maintenance.

(B) Lane Operator Manual.

1. General information for all lane operators including station safety, lane operator responsibilities, and general information about the Missouri I/M program test network.
2. Step by step procedures for operating all lanes, including using the computer, and emissions testing with one or two lane operators.
3. Problem-solving strategies including courtesy with the public, elective inspections, interrupted test procedures, equipment failures, computer failures, and error messages.

(C) Waiver Inspector's/Station Manager's PC Handbook.

1. Introduction - includes general information for the I/M program network computer including the station manager's computer, waiver inspector's computer, MDNR computers, and the inspection lane computer.
2. Inspection station computer set up - includes equipment description, equipment set up, operator input overview, keyboard description, data entry, system start up, and the main menu.
3. Working with the main menu - includes conventions, standard keystrokes, main menu commands, test and vehicle functions, emissions and test review, issuing waivers, entering repair data, reprinting certificates, statistics and reports, test statistics, wait times, bench calibrations, Carbon Monoxide (CO) levels, mail, analyzer diagnostics, uploading lane inspection data, file transfers, maintenance, downtime, security functions, and shutdown.
4. Problem solving - includes courtesy with the public, equipment failures, and computer errors.

(D) Host Computer Operators Manual.

1. Hardware - includes Central Processing Unit, disks, formatting disks, tape backups, printers, terminal server, terminals, and modems.
2. Software.

(E) Station Installation Manual.

1. Site preparation requirements - includes general safety precautions, facility, equipment and tool checklists, documents, drawings, and manuals.
2. Lane installation procedures - includes prompter procedures, dynamometer procedures, electrical, CO monitor, and analyzer installation.
3. Station computer equipment installation procedures.

Part b) Record Keeping and Document Security

I. Record Keeping

(A) Equipment maintenance and calibration records. The contractor shall be responsible for completing and retaining emission equipment maintenance and calibration records for a period of at least two (2) months after being audited by MDNR personnel. Emission equipment maintenance and

calibration records may be transmitted electronically to MDNR on a daily, weekly or monthly basis, or as otherwise determined acceptable to MDNR.

(B) Emission test data. The contractor shall provide to MDNR, the results of each emission test conducted within an inspection cycle. The requirements for data collection and transmission shall be as specified in the contract between MDNR and the contractor.

The contractor shall maintain a duplicate tape of all test results and other transactions, in the event that there are problems with the on-line transmission. This tape may be erased only after notification by MDNR that the data from the original transmission has been satisfactorily transferred for data processing.

MDNR shall maintain all test results and other transactions on tape for ten (10) years, and paper records for two (2) years, after the test date.

(C) Repair performance monitoring. The contractor shall be responsible for collecting emission repair information concerning subject vehicles that have failed the emission inspection and have been returned for a reinspection.

1. When a vehicle that has failed an initial inspection is returned for a reinspection, information as prescribed by Section (7)(B) of the I/M Rule and the contract between MDNR and the contractor which is provided on the repair data form will be recorded on the contractor's computer by an emission inspector.
2. The requirements for maintaining repair information records stored by computer shall be as follows:

    a. The contractor will keep the repair information for use in preparing test result reports.
    b. The contractor will transmit this information to MDNR and may erase this information at the individual inspection stations after the contractor has verified that all information was accurately and fully transmitted.

3. The contractor will transfer the actual completed test result forms to MDNR after information from the form has been entered into a computer database.

(D) The contractor will make all records available to MDNR quality assurance personnel and other authorized State personnel during periodic station audits.

II. Document Security

(A) Measures shall be taken to maintain the security of all documents which verify compliance with inspection requirements including, but not limited to inspection result forms, emission inspection certificates of compliance forms, and emission inspection stickers. The measures taken to ensure document security will be as follows :

1. Compliance documents will be counterfeit resistant to the extent possible. All compliance documents will be approved by MDNR in writing to the contractor before use or will be obtained directly from MDNR.
2. All emission inspection stickers and emission inspection certificates of compliance will be printed with a unique serial number and, where appropriate, an official program seal.
3. Measures will be taken to ensure that compliance documents can not be stolen or removed without being damaged. Documents will be kept under lock and key. Other measures deemed appropriate to maintain document security may also be used.

Part c) Equipment Specifications

I. General Requirements

(A) Specifications for the test equipment used in the Missouri Inspection and Maintenance (I/M) program can be found in the Rules and Regulations (Attachment 2). Gas analyzers meet or exceed the Bureau of Automotive Repair (California) bench specifications and meet or exceed the specifications contained in Appendix A, B, and D of the EPA Inspection/Maintenance Program Requirements; Final Rule.

Testing is automated to the highest degree possible. All data from calibrations, self-checks, testing, etc. are recorded and instantaneously transmitted electronically to the host computer system. This information is then reported to MDNR on a routine basis. Analyzers and software will be updated as necessary to accommodate new test procedures and vehicle technology.

(B) Summary of analyzer specifications.

1. A hydrocarbon (HC) hang-up check is performed prior to each test. If the HC reading exceeds twenty parts per million (20 ppm) the system is purged with clean air. If the HC reading does not drop to twenty parts per million (20 ppm) the system is locked out and testing cannot continue.

2. Automatic zero and span is performed prior to each test. The span check includes the HC, Carbon Monoxide (CO), and Carbon Dioxide (CO_2) channels of the analyzer. If zero or span levels exceed acceptable tolerances, the analyzer is locked out and testing cannot continue. In addition, electronic integrity checks are made prior to each test.
3. Low flow is checked by a now indicator, which monitors the flow condition of the analyzer. If adequate flow is not maintained the analyzer is locked out and testing cannot continue.
4. A leak check is performed upon initial warm up of the analyzer and every four hours thereafter. The probe is capped and the system is then checked for flow leakage. If the leak checks are not performed or if the system demonstrates a leak, the system is locked out and testing cannot continue.
5. A two point gas calibration for HC, CO, and CO_2 is performed, using gases certified to (±) two percent (2%), on each analyzer each hour. If the calibration is not performed or if the analyzer cannot calibrate within acceptable tolerances the analyzer is locked out and testing cannot continue.
6. Barometric pressure is considered by analyzers that automatically compensate for pressure variations.
7. Span points used for calibration are at three hundred (300) ppm for HC, 1.0 percent for CO, and 6.0 percent for CO_2. Acceptable tolerance levels are (±) two percent.
8. All span gases used for calibrations are traceable to the National Institute of Standards and Technology and are (±) two percent (2%).
9. Dynamometers are checked for roll speed accuracy and proper power absorber settings on a weekly basis.
10. Multi-point calibrations are performed on a monthly basis at twenty percent (20%), forty percent (40%), sixty percent (60%), and eighty percent (80%) of full scale.
11. The exhaust gas sampling algorithm is designed such that the analysis of exhaust gases begins after ten (10) seconds at a sampling rate of twice per second. Pass/fail determination is made using a simple running average taken over five seconds.
12. The pass/fail determination is performed automatically by the analyzer.
13. Void test conditions are exemplified when the test ends because the value for carbon dioxide is less than four percent (4%) by volume.
14. Multiple exhaust pipes are simultaneously sampled automatically and averaged by the analyzer.
15. The preconditioning mode is initiated if a vehicle fails the initial idle test. Failure of the initial idle test triggers the analyzer to automatically prompt for a loaded mode preconditioning.

Preconditioning is performed for a minimum of thirty (30) seconds at a speed of thirty (30) miles per hour.

(C) Acceptance Testing.

Acceptance testing for equipment and operations will be conducted in early 2000 prior to the start of mandatory testing.

Part d) Enforcement Procedures

I. Enforcement of Registration Requirements

The penalty for not complying with the requirements of the vehicle inspection program is registration denial. If a motorist has not received a certificate of pass or waiver, the Missouri DOR shall not renew the vehicle's registration. Exceptions to this are vehicles that have received an exemption, discussed in subsection 3 of section 643.3 15 (Attachment 1).

(A) Penalties for Expired Registration.

A vehicle owner driving on expired tabs (registration) is subject to receiving a citation from local, county or state law enforcement officials. All city, county or state law enforcement officials or parking meter enforcement staff have the authority to issue a citation for expired tabs. This authorization is contained in Missouri statute.

Tab expiration can easily be determined by comparing the renewal month displayed on the license plate with the year displayed on the tab. Tabs are produced in different colors each year to assist law enforcement officials with this determination. In addition, agents of the state, county or local law enforcement agencies can verify if a registration has expired by calling MDOR. Many law enforcement officials have the ability to directly access from their squad cars the vehicle registration database.

If a vehicle owner is cited (ticketed) for an expired registration the owner is assessed a fine which ranges from $20 to $60, including court costs. Specific fines vary depending on the county the citation was issued in. A separate fine is assessed in some of the covered counties for failure to have a certificate of inspection.

II. Enforcement of Emissions Inspection Requirements

The emissions inspection requirements are enforced through the vehicle registration process. Motorists whose vehicles have been identified by MDOR as being subject to testing must bring the original Certificate of Compliance. Waiver

or Exemption with them to the MDOR Motor Vehicle Registration Office to renew their registration. If the appropriate certificate is not presented, registration renewal is denied.

Certificates of Compliance, Waiver or Exemption are part of the vehicle inspection requirements and are printed on tamper resistant paper. Each certificate contains a pre-printed sequential serial number, a computer generated serial number, date of issue, test/waiver serial number, vehicle license plate number, vehicle identification number, vehicle make, vehicle year, the expiration date when applicable and the inspection result. All of the above information, and complete testing statistics, are available to MDNR and the contractor staff using the on-line host computer system.

The Missouri I/M program uses a separate "sticker" to identify compliance with emissions testing. Thus, compliance can be easily determined by visually observing whether an emissions sticker is current. Additionally, the vehicle's license plate tab may be visually observed to identify compliance with emissions testing since registration renewal is denied if the emissions testing requirements are not satisfied.

(A) Preventing Avoidance to Emissions Testing.

Vehicles are identified as subject to emissions testing by the MDOR. The MDOR classifies vehicles based on their make, model year and weight when the vehicle is first registered into the state motor vehicle database. The MDOR identifies all light-duty passenger vehicles and light-duty trucks, matches these classes with the appropriate zip code to identify those registered in the four county St. Louis metropolitan area, and prints an inspection equipment on their annual registration renewal notice. These are the vehicles identified as subject to emissions testing.

Some vehicles slip through the identification process either by being incorrectly classified or because the vehicle owner has registered the vehicle outside the four (4) county St. Louis metropolitan area, even though that person actually lives inside the four (4) county St. Louis metropolitan area.

Vehicles that have been classified incorrectly generally show up either at the vehicle inspection station or at MDOR where the correction is made.

Vehicles where the owner is trying to avoid testing because the vehicle is registered outside the four (4) county St. Louis metropolitan area are more difficult to identify. When renewing a vehicle registration, the vehicle owner is asked to supply their permanent residence address; most of the time the address displayed on the driver's license is used for this purpose. The same question is asked when a resident of the state is applying for or

renewing their driver's license. There is no direct cross check made between the addresses claimed on the driver's license and the vehicle registration. However, every precaution is made by MDOR and MDNR to assure that these addresses are the same and therefore vehicles are not being excluded from the emissions testing requirement due to manipulating the registration address.

III. Compliance Rate

(A) General Requirements.

Compliance rate, as understood by the Missouri I/M program, is a percent based on the number of vehicles that should be tested compared to the number of vehicles that did get inspected.

The compliance rate is driven by the number of vehicles that did not get tested that should have been tested. It is assumed that as this number gets smaller the compliance rate would increase. MDNR will strive for one hundred percent (100%) compliance; however, we conclude that minor changes in the statistics would not yield significant changes in the compliance rate.

(B) Commitment to an Enforcement Level.

The Missouri VM program will strive to achieve an enforcement level which ensures that all of the motor vehicles subject to inspection are actually inspected. MDNR commits to a compliance rate of ninety six percent (96%), a stringency rate of twenty three percent (23%), and a pre/post waiver rate not to exceed twelve percent (12%).

Part e) Enforcement Oversight Procedures

I. General Requirements

MDNR is charged with administrative oversight of the I/M program and provides this oversight by enforcing all provisions of the law, rule, and contract between MDNR and the contractor. To oversee quality control and assure motorist compliance, the MDNR relies on the established MDOR motor vehicle registration system and the I/M on-line host computer system.

II. Oversight of Information

(A) Verification of Exempt Vehicle Status.

Vehicles exempted from the Missouri I/M program include vehicles that are not subject to testing as required by statute in Attachment 1 and vehicles exempted by MDNR as required by rule in Attachment 2.

Each month the MDOR assesses which vehicles are subject to testing based on their registration record and mails out a notice for registration renewal containing the emission inspection fee if appropriate. Vehicle status changes are administered through MDOR and the database is updated accordingly. For example, if a motorist is not subject to emissions testing because the motorist lives outside the four county St. Louis metropolitan area but now has moved inside the area, the MDOR would update the registration record to assure that the vehicle is now subject to testing.

Exemptions granted by MDNR are reviewed on a monthly basis. If MDNR learns, through comparing testing records against registration records or through MDOR, that a vehicle's status has changed then the exemption is removed and the vehicle is subject to testing. For example, if a vehicle was originally exempted because the vehicle contained a diesel engine but that engine had been replaced with a gasoline engine, MDNR would remove the diesel exemption and require the vehicle to be inspected.

(D) Data Accuracy.

Test data accuracy is assured through automation of the testing process and utilization of the motor vehicle registration database maintained by the MDOR. When the enhanced I/M program is implemented in 2000, a complete copy of the motor vehicle registration database will be loaded into the program's host computer system. Because the I/M program is not "on-line" with the MDOR database, the MDOR will supply MDNR with an electronic data tape every two (2) weeks. The data tape, incorporated into the I/M program database, reflects changes in ownership and registration status and includes vehicles added to or removed from the system.

Independent of the updated registration database, the contractor will maintain a separate database which contains all pertinent testing statistics and information relevant to the emissions gas analyzer. These two databases are used interactively to assure that the vehicle obtaining an emissions test is required to be tested, is the correct vehicle being tested, and that all specifics to the test are accurately recorded and maintained. This entire process is done automatically.

(C) Audit Trail.

A complete audit trail is maintained within the Missouri I/M program through the host computer system and interactive software at MDNR. Interactive software, developed by the contractor allows complete real-time access to all test statistics, analyzer quality control information, and operational statistics. In addition to real-time information, summary statistical reports are routinely generated through the host computer system. Specific reports and examples of real-time information are discussed later in this section.

(D) Fines Against Stations for Missing or Unaccounted for Documents.

Although there are a variety of forms and documents used in the Missouri I/M program, the Vehicle Inspection Report which contains the Certificate of Compliance, Waiver or Exemption, has the most potential for abuse if it is missing or unaccounted for. Station managers are held accountable for all Vehicle Inspection Reports. At the beginning of each day the station manager must enter the starting Vehicle Inspection Report serial number into the computer system. The computer system then tracks each Vehicle Inspection Report. At the end of the day station managers reconcile the Vehicle Inspection Report usage and account for any discrepancies. Typically, some Vehicle Inspection Reports are destroyed or "wasted" when they jam in the dot matrix printers; however, overall this process assures excellent document control.

MDNR may request that a station manager be disciplined if Vehicle Inspection Reports are found to be missing or unaccounted for. In addition, MDNR retains ten percent of each month's payment to the contractor and releases the amount retain to the contractor on a quarterly basis provided satisfactory performance has been demonstrated.

III. Evaluation of Program Effectiveness

Evaluation of program effectiveness is based on quality assured information for the subject vehicle population, registration database, and the testing database.

MDNR, in conjunction with the contractor, shall conduct a monthly review of testing statistics and enforcement information to determine program effectiveness. When a performance issue has been identified, immediate corrective action is taken to resolve the problem. This action may involve a simple change in testing procedure, training of personnel, maintenance scheduling, or administrative relief through fines or penalties.

MDNR does not currently use parking lot surveys or roadside pullovers to assess the compliance status of the in-use fleet. MDNR uses the I/M program host computer to make a monthly comparison between the testing database and the registration database to determine how many vehicles have evaded the emissions

test requirement by renewing vehicle registration without receiving a Certificate of Pass, Waiver or Exemption.

Part f) Quality Assurance Procedures

I. General Requirements

(A) MDNR will conduct performance audits on a periodic basis to determine whether inspectors are correctly performing all tests and other required functions.

1. Performance audits may be of two types:

a. Overt performance audits which may include the following:

i. A check for appropriate document security.
ii. A check to see that required record keeping practices are being followed.
iii. A check for licenses or certificates and other required display information.
iv. Observation and written evaluation of each inspector's ability to properly perform an inspection.

b. Covert performance audits which may include the following:

i. Remote visual observation of inspector and inspection station personnel performance, which may include the use of binoculars or video cameras.
ii. Site visits using covert vehicles.
iii. Other activities deemed appropriate by the department as necessary to maintain the level of inspection and maintenance program quality assurance required by federal law.

2. Number of audits conducted. The following number of audits will be conducted by MDNR or an agent representing MDNR for the entire inspection and maintenance area:

a. Covert audits:

i. At a minimum, one (1) per year, for each inspector.
ii. At a minimum, four (4) per year, per I/M facility outside the normal program (i.e. facilities at fleet sites).

b. Overt audits:

i. At a minimum, two (2) per year, per normal test lane.

ii. At a minimum, six (6) per year, per I/M facility outside the normal program (i.e. facilities at fleet sites).

3. Each audit may satisfy more than one (1) of the previous criteria. Additional audits may be conducted on the basis of suspicion by the quality assurance officer that a violation of contractual agreement, state rules, or state law has occurred or on the basis of consumer complaints.
4. Documentation of the audit sufficient for building a legal case and establishing a performance record shall be kept. A summary of the audits shall be included as part of the annual report presented to EPA and Missouri State legislature.
5. The contractor and all employees of the contractor will make available all information requested by MDNR and will fully cooperate with MDNR personnel who conduct the audits and other dully authorized State representatives or agents.
6. Security required from the contractor. The MDNR shall have the authority to require security from the contractor for these purposes and in the amounts deemed necessary.

(B) MDNR shall conduct record audits on a periodic basis to assess station performance and identify problems that may identify potential fraud or incompetence. Such review shall include:

1. Software-based, computerized analysis to identify statistical inconsistencies, unusual patterns, and other discrepancies.
2. Visits to inspection stations to review records not already covered in the electronic analysis.
3. Comprehensive accounting for all official forms that can be used to demonstrate compliance with the program.

(B) MDNR shall conduct equipment audits on a periodic basis during overt performance audits to evaluate quality control of required test equipment. Such evaluation shall include:

1. A gas audit using gases of known concentrations at least as accurate as those required for regular equipment quality control and comparing these readings to actual readings.
2. A check for tampering, worn instrumentation, blocked filters, and other conditions that would impede accurate sampling.

3. A check for critical flow in critical flow Constant Volume Sampler units.
4. A check of the Constant Volume Sampler now calibration.
5. A check for the optimization of the Flame Ionization Detection fuel-air ratio using methane.
6. A leak check.
7. A check to determine that station gas bottles used for calibration purposes are properly labeled and within the relevant tolerances.
8. Functional dynamometer checks addressing coast-down, roll speed and roll distance, inertia weight selection, and power absorption.
9. A check of the system's ability to accurately detect background pollutant concentrations .
10. A check of the evaporative monitoring devices used to perform the evaporative test.